Amendments to the Claims

The following listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims

1. (Currently amended) An optical waveguide device, comprising:

a first optical waveguide having a first end;

a second optical waveguide having a first end, the first ends of the first and second optical waveguides being separated by a gap; and

an optical coupler extending across the gap between the first ends of the first and second optical waveguides, the optical coupler comprising ~~material including~~ a waveguide region and a region surrounding the waveguide region, the waveguide region having a first refractive index and a shape that diverges from the first end of each of the first and second optical waveguides as defined by overlapping cones of light emitted from the first ends of the first and second optical waveguides into the ~~material~~ optical coupler, and the region surrounding the waveguide region having a second refractive index different from the first refractive index.

2. (Currently amended) The optical waveguide device of claim 1 ~~2~~, wherein the waveguide region comprises a material that has a refractive index capable of being increased by exposing the material to light of a particular wavelength or wavelength band.

3. (Currently amended) The optical waveguide device of claim 2 ~~3~~, wherein exposing the material to the light of a particular wavelength or wavelength band causes the material to undergo cross-linking.

4. (Currently amended) An ~~The~~ optical waveguide device, comprising: ~~of claim 3,~~

a first optical waveguide having a first end;

a second optical waveguide having a first end, the first ends of the waveguides being separated by a gap; and

an optical coupler extending across the gap between the first ends of the waveguides, the optical coupler comprising material including a waveguide region, the waveguide region having a shape defined by overlapping cones of light emitted from the first ends of the optical waveguides into the material,

wherein the material has a refractive index capable of being increased by exposing the material to light of a particular wavelength or wavelength band, wherein exposing the material to the light of a particular wavelength or wavelength band causes the material to undergo cross-linking, and wherein the material undergoes cross-linking by one of one-photon absorption and two-photon absorption.

5. (Canceled)

6. (Currently amended) An ~~The~~ optical waveguide device, comprising: ~~of claim 1,~~

a first optical waveguide having a first end;

a second optical waveguide having a first end, the first ends of the waveguides being separated by a gap; and

an optical coupler extending across the gap between the first ends of the waveguides, the optical coupler comprising material including a waveguide region, the waveguide region having a shape defined by overlapping cones of light emitted from the first ends of the optical waveguides into the material, wherein:

the first and second optical waveguides each comprise a core surrounded by a cladding, the cladding having ~~a~~ an index of refraction; and

in the waveguide region, the material has a refractive index greater than the refractive index of the cladding of the optical waveguides.

7. (Currently amended) An ~~The~~ optical waveguide device, comprising: ~~of claim 1,~~

a first optical waveguide having a first end;

a second optical waveguide having a first end, the first ends of the waveguides being separated by a gap; and

an optical coupler extending across the gap between the first ends of the waveguides, the optical coupler comprising material including a waveguide region, the waveguide region having a shape defined by overlapping cones of light emitted from the first ends of the optical waveguides into the material, wherein:

the first optical waveguide comprises a first waveguide core and first cladding region, the first cladding region surrounding the first waveguide core, the first waveguide core and the first cladding region having respective refractive indices, the refractive index of the first cladding region being lower than the refractive index of the first waveguide core;

the second optical waveguide comprises a second waveguide core and second cladding region, the second cladding region surrounding the second waveguide core, the second waveguide core and the second cladding region having respective refractive indices, the refractive index of the second cladding region being lower than the refractive index of the second waveguide core; and

the waveguide region of the material has a refractive index greater than the refractive indices of the first and second cladding regions.

8. (Original) The optical waveguide device of claim 1, wherein the first and second optical waveguides each comprise an optical fiber.

9. (Currently amended) An ~~The~~ optical waveguide device, comprising: ~~of claim 1,~~

a first optical waveguide having a first end;

a second optical waveguide having a first end, the first ends of the waveguides being separated by a gap; and

an optical coupler extending across the gap between the first ends of the waveguides, the optical coupler comprising material including a waveguide region, the waveguide region having a shape defined by overlapping cones of light emitted from the first ends of the optical waveguides into the material, wherein:

the material included in the waveguide region has a first refractive index; and

the waveguide region is surrounded by one of a solid form of the material having a refractive index less than the first refractive index, and a liquid form of the material having a refractive index less than the first refractive index.

10. (Canceled)

11. (Currently amended) A method for aligning optical waveguides, the method comprising:

providing a first optical waveguide and a second optical waveguide;

axially aligning the first and second optical waveguides leaving a gap between adjacent ends of the aligned waveguides;

filling the gap with a material having a refractive index capable of being increased by exposing the material to light; and

exposing the material to overlapping conical beams of light emitted from the adjacent ends of the first and second optical waveguides to define a waveguide region in the material having a refractive index and a shape that diverges from the adjacent ends of each of the first and second optical waveguides as defined by the overlapping ~~cones~~ conical beams of light ~~emitted from the first ends of the optical waveguides~~, the exposing increasing the refractive index of the material in ~~a~~ the waveguide region ~~in which the beams of light overlap~~ to provide the waveguide region with a refractive index that differs from a refractive index of a region surrounding the waveguide region.

12. (Currently amended) A ~~The~~ method ~~of claim 11, further~~ for aligning optical waveguides, the method comprising:

providing a first optical waveguide and a second optical waveguide;

axially aligning the first and second optical waveguides leaving a gap between adjacent ends of the aligned waveguides;

filling the gap with a material having a refractive index capable of being increased by exposing the material to light;

exposing the material to conical beams of light emitted from the adjacent ends of the waveguides, the exposing increasing the refractive index of the material in a region in which the beams of light overlap; and

uniformly exposing the material to light of an intensity less than the intensity in the region.

13. (Original) The method of claim 11, wherein the exposing comprises propagating incoherent light of the same wavelength through both optical waveguides.

14. (Original) The method of claim 11, wherein the exposing comprises propagating light of a different wavelength through each of the optical waveguides.

15. (Original) The method of claim 11, wherein the exposing increases the refractive index of the material by causing the material to undergo cross-linking.

16. (Currently amended) A ~~The~~ method for aligning optical waveguides, the method comprising: ~~of claim 15,~~

providing a first optical waveguide and a second optical waveguide;

axially aligning the first and second optical waveguides leaving a gap between adjacent ends of the aligned waveguides;

filling the gap with a material having a refractive index capable of being increased by exposing the material to light; and

exposing the material to conical beams of light emitted from the adjacent ends of the waveguides, the exposing increasing the refractive index of the material in a region in which the beams of light overlap,

wherein the exposing increases the refractive index if the material by causing the material to undergo cross-linking, and wherein the cross-linking is the result of one of one-photon absorption and two-photon absorption.

17. (Canceled)

18. (Original) The method of claim 11, wherein the first and second optical waveguides each comprise an optical fiber.